



16869P-017800US
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011593/0960 PAGE 2

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SERIAL NUMBER: 09791911
PATENT NUMBER:

FILING DATE: 02/22/2001
ISSUE DATE:

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ASSIGNMENT DIVISION
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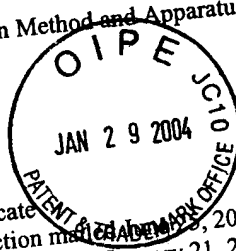


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16869P-017810US
09/802,693
A Circuit Pattern Inspection Method and Apparatus
Takashi Hiroi, et al.
January 26, 2004
RL:asb



Enclosed

- 1) Transmittal
- 2) Fee Transmittal-In Duplicate
- 3) Amendment to Office Action mailed January 28, 2003 and Notice of Non-Compliant Amendment dated January 21, 2004
- 4) Return Postcard

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60126743 v1

003 and Notice of
2004

60126743 v1



TRANSMITTAL FORM <i>(to be used for all correspondence after initial filing)</i>	Application Number	09/802,693	
	Filing Date	March 8, 2001	
	First Named Inventor	Hiroi, Takashi	
	Art Unit	2621	
	Examiner Name	Brian P. Werner	
Total Number of Pages in This Submission		Attorney Docket Number	16869P-017810US

ENCLOSURES (Check all that apply)		
<input checked="" type="checkbox"/> Fee Transmittal Form <input type="checkbox"/> Fee Attached <input checked="" type="checkbox"/> Amendment/Reply <input type="checkbox"/> After Final <input type="checkbox"/> Affidavits/declaration(s) <input type="checkbox"/> Extension of Time Request <input type="checkbox"/> Express Abandonment Request <input type="checkbox"/> Information Disclosure Statement <input type="checkbox"/> Certified Copy of Priority Document(s) <input type="checkbox"/> Response to Missing Parts/Incomplete Application <input type="checkbox"/> Response to Missing Parts under 37 CFR 1.52 or 1.53	<input type="checkbox"/> Drawing(s) <input type="checkbox"/> Licensing-related Papers <input type="checkbox"/> Petition <input type="checkbox"/> Petition to Convert to a Provisional Application <input type="checkbox"/> Power of Attorney, Revocation Change of Correspondence Address <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Request for Refund <input type="checkbox"/> CD, Number of CD(s)	<input type="checkbox"/> After Allowance Communication to Group <input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences <input type="checkbox"/> Appeal Communication to Group (Appeal Notice, Brief, Reply Brief) <input type="checkbox"/> Proprietary Information <input type="checkbox"/> Status Letter <input checked="" type="checkbox"/> Other Enclosure(s) <i>(please identify below):</i> Return Postcard
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Firm or Individual	Townsend and Townsend and Crew LLP Chun-Pok Leung Reg. No. 41,405	
Signature		
Date	1-26-04	

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Signature		Date	1/26/04

SEP 30 2005

PTO/SB/17 (10-03)

FEE TRANSMITTAL for FY 2004

Effective 10/01/2003. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$) 90

Complete if Known

Application Number 09/802,693
 Filing Date March 8, 2001
 First Named Inventor Hiroi, Takashi
 Examiner Name Brian P. Werner
 Art Unit 2621
 Attorney Docket No. 16869P-017810US

METHOD OF PAYMENT (check all that apply)

☐ Check ☐ Credit Card ☐ Money Order ☐ Other ☐ None
☒ Deposit Account:

Deposit Account Number

20-1430

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Townsend and Townsend and Crew LLP

The Director is authorized to: (check all that apply)

☒ Charge fee(s) indicated below ☒ Credit any overpayments☒ Charge any additional fee(s) or any underpayment of fee(s)☐ Charge fee(s) indicated below, except for the filing fee to the above-identified deposit account.

FEE CALCULATION

1. BASIC FILING FEE

Large Entity	Small Entity	Fee Code	Fee (\$)	Fee Description	Fee Paid
		1001	770	2001 385 Utility filing fee	
		1002	340	2002 170 Design filing fee	
		1003	530	2003 265 Plant filing fee	
		1004	770	2004 385 Reissue filing fee	
		1005	160	2005 80 Provisional filing fee	

SUBTOTAL (1)

(\$)

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

			Extra Claims	Fee from below	Fee Paid
Total Claims	31	-26** =	5	X\$18	\$90
Independent Claims	6	-6** =	0	X\$86	\$0
Multiple Dependent				X	

Large Entity	Small Entity	Fee Code	Fee (\$)	Fee Description
		1202	18	2202 9 Claims in excess of 20
		1201	86	2201 43 Independent claims in excess of 3
		1203	290	2203 145 Multiple dependent claim, if not paid
		1204	86	2204 43 ** Reissue independent claims over original patent
		1205	18	2205 9 ** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2)

(\$)90

**or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large	Entity	Small	Entity	Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet.	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	420	2252	210	Extension for reply within second month	
1253	950	2253	475	Extension for reply within third month	
1254	1,480	2254	740	Extension for reply within fourth month	
1255	2,010	2255	1,005	Extension for reply within fifth month	
1401	330	2401	165	Notice of Appeal	
1402	330	2402	165	Filing a brief in support of an appeal	
1403	290	2403	145	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive - unavoidable	
1453	1,330	2453	665	Petition to revive - unintentional	
1501	1,330	2501	665	Utility issue fee (or reissue)	
1502	480	2502	240	Design issue fee	
1503	640	2503	320	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Petitions related to provisional applications	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	770	2809	385	Filing a submission after final rejection (37 CFR § 1.129(a))	
1810	770	2810	385	For each additional invention to be examined (37 CFR § 1.129(b))	
1801	770	2801	385	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify)

*Reduced by Basic Filing Fee Paid SUBTOTAL (3)

(\$)

SUBMITTED BY

Complete (if applicable)

Name (Print/Type) Chun-Pok Leung Registration No. (Attorney/Agent) 41,405 Telephone 650-326-2400
 Signature *[Signature]* Date 1-26-04

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PATENT
Attorney Docket No.: 16869P-017810US
Client Ref. No.: 210000889US2

Commissioner for Patents
P.O. Box 1450
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On January 26, 2004

TOWNSEND and TOWNSEND and CREW LLP

By: 

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Takashi Hiroi et al.

Application No.: 09/802,693

Filed: March 8, 2001

For: A CIRCUIT PATTERN
INSPECTION METHOD AND
APPARATUS

Customer No.: 20350

Confirmation No. 8024

Examiner: Brian P. Werner

Technology Center/Art Unit: 2621

AMENDMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the Office Action mailed June 25, 2003 and the Notice of Non-Compliant Amendment mailed January 21, 2004, please enter the following amendments and remarks:

Amendments to the Specification begin on page 2 of this paper.

Amendments to the Claims are reflected in the listing of claims which begins on page 3 of this paper.

Remarks/Arguments begin on page 10 of this paper.

Appl. No. 09/802,693

PATENT

Amdt. dated January 26, 2004

Reply to Office Action of June 25, 2003 and Notice of Non-Compliant Amendment mailed January 21, 2004

Amendments to the Specification:

Please replace the paragraph at page 1, lines 10-12 with the following amended paragraph:

U.S. Patent Application Serial No. 09/791,911 _____ "A Circuit Pattern Inspection Method And Apparatus," by Takashi Hiroi, ~~et~~ et al., filed February 22, 2001 (Attorney Docket No. 16869P-017800).

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application.

Please amend claims 34, 36, and 39; and add new claims 83-87 as follows.

Listing of Claims:

1. (canceled)
2. (canceled)
3. (canceled)
4. (canceled)
5. (canceled)
6. (canceled)
7. (canceled)
8. (canceled)
9. (canceled)
10. (canceled)
11. (canceled)
12. (canceled)
13. (canceled)
14. (canceled)
15. (canceled)
16. (canceled)
17. (canceled)
18. (canceled)
19. (canceled)
20. (canceled)
21. (canceled)
22. (canceled)

23. (canceled)

24. (canceled)

25. (canceled)

26. (canceled)

27. (canceled)

28. (canceled)

29. (canceled)

30. (canceled)

31. (canceled)

32. (canceled)

33. (canceled)

34. (currently amended) A method of resetting a threshold using a display coupled with a computer, said method comprising:

displaying a first standard on said display, said first standard used to select defect candidate image indications to be shown on a defect candidate distribution screen of said display;
and

graphically displaying a relation between defect density and threshold in which said first standard is indicated;

changing said first standard to a second standard, ~~wherein said defect candidate image indications on said defect distribution screen change responsive to said second standard on~~ said display; and

changing said graphical display in response to said change to said second standard.

35. (original) The method of claim 34 further comprising:

selecting a selected indication of said defect candidate image indications; and
viewing an inspection image associated with said selected indication.

36. (currently amended) The method of claim 34 wherein said first standard threshold is calculated using an electron beam noise value for a SEM system.

37. (withdrawn) A method in a computer system for determining a threshold for use in actual inspection of a semi-conductor material, comprising a circuit pattern, said method comprising:

displaying a first threshold and a second threshold;

displaying a graphic representation of a defect candidate image with a margin greater than or equal to said second threshold minus said first threshold;

when said graphic representation of said defect candidate image is selected for expanded viewing, displaying a clipped image associated with said graphic representation; and

when said defect candidate image is a false defect, and a predetermined number of allowable false defects is exceeded, receiving a new second threshold.

38. (withdrawn) The method of claim 37 wherein said clipped image is selected from a group consisting of a clipped inspection image, a clipped reference image, or a clipped defect candidate image.

39. (currently amended) A method in a computer system for displaying a defect candidate, said defect candidate stored in a memory, said method comprising:

displaying a two-dimensional defect candidate distribution for a standard threshold on a first screen, said two-dimensional defect candidate distribution comprising an indication of said defect candidate; and

displaying on a second screen an expanded view of said defect candidate, responsive to a selection of said indication on said first screen,

wherein said two-dimensional defect candidate distribution displayed on said first screen changes by changing said standard.

40. (original) The method of claim 39 wherein said expanded view comprises an image associated with said defect candidate and selected from a group consisting of a clipped inspection image, a clipped reference image, or a defect candidate image.

41. (original) The method of claim 39 wherein said expanded view comprises a re-scanned image of said defect candidate.

42. (original) The method of claim 39 further comprising a threshold screen for changing said threshold.

43. (original) The method of claim 39 further comprising a screen displaying a graph of defect density versus threshold.

44. (original) The method of claim 39 wherein said two-dimensional defect candidate distribution displays defect candidates responsive to a user selected area.

45. (original) The method of claim 39 wherein said two-dimensional defect candidate distribution displays defect candidates by type of defect.

46. (original) The method of claim 45 wherein each type of defect has a different symbol, said defect being displayed using a symbol.

47. (withdrawn) The method of claim 45 wherein each type of defect has an associated threshold value.

48. (original) The method of claim 39 wherein said two-dimensional defect candidate distribution displays defect candidates as symbols.

49. (original) The method of claim 48 wherein a symbol of said symbols comprise a grayscale value.

50. (withdrawn) The method of claim 49 wherein said grayscale value is related to a margin.

51. (original) The method of claim 49 wherein said grayscale value is related to an enhanced result.

52. (original) The method of claim 48 wherein a symbol of said symbols comprise a color value.

53. (original) The method of claim 48 wherein a symbol of said symbols comprise a black or a white value.

54. (withdrawn) A system for displaying a symbol associated with a defect candidate of said plurality of defect candidates, comprising:

a computer readable medium for storing images associated with said plurality of defect candidates, wherein said images comprise an inspection image and a reference image associated with said defect candidate;

a processor coupled with said computer readable medium for determining a margin associated with said defect candidate, said margin calculated using said inspection image and said reference image; and

a display for displaying said symbol when said margin is equal to or above a threshold difference.

55. (withdrawn) The system of claim 54 wherein said threshold difference is a difference between a display threshold value and a predetermined initial threshold value.

56. (canceled)

57. (canceled)

58. (canceled)

59. (canceled)

60. (canceled)

61. (canceled)

62. (canceled)

63. (canceled)

64. (canceled)

65. (canceled)

66. (withdrawn) A method for determining a selected threshold of a plurality of thresholds, said plurality of thresholds for use in actual defect inspection of a semiconductor, said method comprising:

determining said plurality of thresholds from a defect difference distribution;

displaying to a user an indication for each of said plurality of thresholds; and

responsive to said user selection of a selected threshold of said plurality of thresholds, displaying symbols of defects with differences greater than or equal to said selected threshold.

67. (withdrawn) The method of claim 66 wherein said determining said plurality of thresholds is based on one or more local minimums in said defect difference distribution.

68. (withdrawn) A system for determining a first threshold for use in actual inspection of circuit pattern defects in a semiconductor material, said system comprising:

a defect detection unit for determining defects with differences above a second threshold minus a predetermined value; and

a display having an input mechanism for adjusting said first threshold, wherein said first threshold has an initial value of said second threshold.

69. (withdrawn) The method of claim 68 wherein said second threshold is related to a defect difference distribution.

70. (canceled)

71. (canceled)

72. (canceled)

73. (canceled)

74. (canceled)

75. (canceled)

76. (canceled)

77. (canceled)

78. (canceled)

79. (canceled)

80. (canceled)

81. (canceled)

82. (canceled)

83. (new) The method of claim 34 wherein the graphical display which is changed in response to said change to said second standard is used to judge an effect of said change to said second standard.

84. (new) The method of claim 83 wherein the graphical display which is changed in response to said change to said second standard is used to judge whether said change to said second standard is proper.

85. (new) The method of claim 39 further comprising changing said standard to change said two-dimensional defect candidate distribution displayed on said first screen.

86. (new) The method of claim 85 wherein said two-dimensional defect candidate distribution displayed on said first screen which is changed in response to said change of said standard is used to judge an effect of said change of said standard.

87. (new) The method of claim 86 wherein said two-dimensional defect candidate distribution displayed on said first screen which is changed in response to said change of said standard is used to judge whether said change of said standard is proper.

REMARKS/ARGUMENTS

Claims 34-55, 66-69, and 83-87 are pending. Claims 37, 38, 47, 50, 54, 55, and 66-69 are withdrawn pursuant to the restriction requirement. Claims 34, 36, and 39 have been amended. Claims 83-87 have been added. No new matter has been introduced. Applicants believe the claims comply with 35 U.S.C. § 112.

Claim 34 stands rejected under 35 U.S.C. § 102(b) as being anticipated by Young et al. (4,870,357).

Applicants respectfully submit that claim 34 as amended is novel and patentable over Young et al. because, for instance, Young et al. does not teach or suggest changing the first standard to a second standard on the display of a relation between defect density and threshold in which the first standard is indicated, and changing the graphical display in response to the change to the second standard.

Young et al. discloses a thresholding process in which a threshold level is selected at step 132 based on the histogram analysis 131. There is no disclosure or suggestion of changing the standard on the display or changing the graphical display of a relation between defect density and threshold in which the first standard is indicated in response to the change to the second standard. The present specification at page 17, line 17, to page 18, line 18 discusses the change of threshold setting or standard (using horizontal bars 1440, 1442) on the display and changing the graphical display in response to the change. The user can easily view trial inspection results after threshold setting or standard change without conducting the trial inspection again as in the conventional system, and therefore can greatly save time as compared with conducting the inspection again; the threshold setting process may be used during actual inspection to make adjustments, and hence the method is more flexible (page 18, lines 19-22).

For at least the foregoing reasons, claim 34 is novel and patentable over Young et al.

Claims 34, 35, 39-46, 48, 49, and 51-53 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Schemmel et al. (6,504,948).

Applicants respectfully submit that independent claim 34 as amended is novel and patentable over Schemmel et al. because, for instance, Schemmel et al. does not teach or suggest changing the first standard to a second standard on the display of a relation between defect density and threshold in which the first standard is indicated, and changing the graphical display in response to the change to the second standard.

Schemmel et al. discloses a first phase (calibration phase 92), a second phase (test phase 94), a third phase (analysis phase 96), and a fourth phase (display phase 98). In the fourth phase, the results may be displayed in a variety of ways (col. 12, lines 1-5). The Examiner alleges "it is clear that during the four phases of inspection, the results of defect detection are displayed to the operator each time." This statement does not appear to find support in Schemmel et al. Moreover, nothing in Schemmel et al. discloses or suggests graphically displaying a relation between defect density and threshold in which the first standard is indicated, or changing the standard on the display and changing the graphical display in response to the change of the standard.

For at least the foregoing reasons, independent claim 34 and claim 35 depending therefrom are novel and patentable over Schemmel et al.

Applicants respectfully submit that independent claim 39 as amended is novel and patentable over Schemmel et al. because, for instance, Schemmel et al. does not teach or suggest that the two-dimensional defect candidate distribution displayed on the first screen changes by changing the standard.

As discussed above, Schemmel et al. merely discloses four phases including the fourth phase of displaying the results, and is devoid of any teaching or suggestion for changing the two-dimensional defect candidate distribution displayed on the first screen by changing the standard.

For at least the foregoing reasons, independent claim 39 and claims 40-46, 48, 49, and 51-53 depending therefrom are novel and patentable over Schemmel et al.

Claims 34 and 36 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Noguchi et al. (6,411,377).

Applicants respectfully submit that independent claim 34 is novel and patentable over Noguchi et al. because, for instance, Noguchi et al. does not teach or suggest changing the first standard to a second standard on the display of a relation between defect density and threshold in which the first standard is indicated, and changing the graphical display in response to the change to the second standard.

Noguchi et al. discloses displaying results of inspection obtained in one of three modes (col. 46, lines 31-38). Nothing in Noguchi et al. teaches or suggests changing the first standard to a second standard on the display of a relation between defect density and threshold in which the first standard is indicated, and changing the graphical display in response to the change to the second standard.

For at least the foregoing reasons, independent claim 34 and claim 36 depending therefrom are novel and patentable over Noguchi et al.

New claims 83 and 84 depend from claim 34, and new claims 85-87 depend from claim 39, and recite additional features that are not taught or suggested in the references. For example, claim 83 recites that the graphical display which is changed in response to the change to the second standard is used to judge an effect of the change to the second standard. Claim 84 recites that the graphical display which is changed in response to the change to the second standard is used to judge whether the change to the second standard is proper. Claim 86 recites that the two-dimensional defect candidate distribution displayed on the first screen which is changed in response to the change of the standard is used to judge an effect of the change of the standard. Claim 87 recites that the two-dimensional defect candidate distribution displayed on the first screen which is changed in response to the change of the standard is used to judge whether the change of the standard is proper. These features are completely absent from the references.

Therefore, new claims 83-87 are novel and patentable over the cited references for the additional features recited therein as well as by being dependent from allowable independent claims 34 and 39.

Appl. No. 09/802,693

Amdt. dated January 26, 2004

Reply to Office Action of June 25, 2003 and Notice of Non-Compliant Amendment mailed January 21, 2004

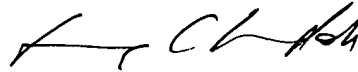
PATENT

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-326-2400.

Respectfully submitted,



Chun-Pok Leung
Reg. No. 41,405

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